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The Use of the Goodenough Draw-A-Man Test as a Predictor of Academic Achievement.

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In an attempt to find a test which minimized cultural bias, three tests were administered to 335 first grade pupils. The subjects comprised 2 groups (123 Anglo children and 212 Spanish surnamed children). The Goodenough Draw-A-Man Test (GDAM) and the Lorge-Thorndike Intelligence Test (LT), Form A, were administered as measures of intelligence. The California Achievement Test (CAT), Form W, 1957 edition, was used as a measure of achievement. Results showed a mean IQ difference between the two groups of 4.39 on the LT and of 2.63 on the GDAM, with the Anglo group scoring higher on both tests. When the CAT scores were covaried with the LT IQ scores the only significant difference found between the two groups at the .01 level was in the "meaning of opposites" subtest. When the CAT scores were covaried with the GDAM IQ scores, differences in six categories were revealed at the .01 level: (1) meaning of opposites, (2) total reading vocabulary, (3) total reading, (4) arithmetic problems, (5) total arithmetic reasoning, and (6) total battery. With this particular population, the GDAM and LT were nearly identical in predicting the CAT. The GDAM tends to bring these two divergent populations closer together as far as IQ scores are concerned. A bibliography and tables are attached. (NT)

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The Use of the Goodenough Draw-A-Man Test as a Predictor of Academic Achievement

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Some time ago Havighurst (1951) identified three major categories of cultural traits and behaviors in the United States: (1) those common to all Americans, (2) those of socio-economic or social class groups and, (3) those of ethnic or nationality groups. Due to the latter two factors, children bring widely disparate cultural experiences to the intelligence test situation. An intelligence test which is to evaluate the "real" ability of children must draw from experiences which are common to all or nearly all of the children to be tested. Torrance (1968) reports that a recent flurry of activity with various instruments to elicit cultural differences fairly and accurately has not yet produced a "genuine breakthrough."

The major emphasis of the Southwestern Cooperative Educational Laboratory (SWCEL) is placed upon the development of educational programs with concomitant evaluative procedures for culturally divergent children. Exploratory experimentation to gain baseline data on these populations with regard to evaluative instruments also has been of prime interest but has not provided any "breakthroughs." This report deals with the measurement attempts with a Spanish surnamed population sample.

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PROCEDURE

Instruments. The Goodenough Draw-A-Man Test (GDAM) and the Lorge-Thorndike Intelligence Test, (LT) Form A, were administered as measures of intelligence. The California Achievement Test, (CAT), Form W, 1957 edition was used as a measure of achievement.

Subjects. In the fall of 1967, a sample of 18 first grade classrooms in four public schools in a lower socio-economic area of a southwestern city were selected for testing. Those subjects (N=335) available for final testing constitute the Ss for this study; 123 Anglo and 212 Spanish surnamed subjects.

The Ss were tested on the third day of school with the GDAM and on the third week of school with the LT. The CAT was administered during the last week of January, 1968. Two judges were trained in the scoring of the GDAM. They established an interrater reliability coefficient of .88.

RESULTS

The analysis of variance between the Anglo and Spanish subjects' scores on the LT reported in Table 1 reveals an F ratio significant at the .01 level. However, the analysis of variance of the scores for the two groups on the GDAM was not significant. This finding is reported in Table 2.

Insert Tables 1 and 2 about here

There was a 4.39 mean IQ difference between the Anglo and Spanish Ss on the LT but only a 2.63 difference on the GDAM.

When the CAT scores were covaried with the LT IQ scores, the only significant difference found between the two groups at the .01 level was the subtest, Meaning of Opposites. There were significant differences at the .05 level between the two groups on the Arithmetic Problems subtest and the Total Reading section. No other significant differences were found between the two groups.

When the CAT was covaried with the GDAM IQ scores, six differences were revealed at the .01 level: (1) Meaning of Opposites, (2) Total Reading Vocabulary, (3) Total Reading, (4) Arithmetic Problems, (5) Total Arithmetic Reasoning, and (6) Total Battery. In addition, there were significant differences between the two groups on five subtests at the .05 level: (1) Word Recognition, (2) Total Reading, (3) Arithmetic Meaning, (4) Arithmetic Addition, and (5) Total Arithmetic.

The data are summarized in Table 3.

Insert Table 3 about here

The correlation matrix shown as Table 4 reveals that the GDAM and the LT correlate at .34, the GDAM and the CAT Total Battery at .31, and the LT and CAT Total Battery at .54. Significance at the .01 and .05 level is achieved by a correlational coefficient of .148 and .113 respectively.

Insert Table 4 about here

The CAT scores for the Anglo and the Spanish surnamed Ss were covaried with the LT and the GDAM scores. Figures 1 and 2 illustrate

graphically the comparisons of the adjusted means by covariance with the national norms for the CAT Subtotals and Total Battery.

Insert Figures 1 and 2 about here

DISCUSSION

It was noted that a significant difference was found in analysis of variance between Anglo and Spanish surnamed Ss' scores on the LT. However, no significant difference was found for the same Ss' scores on the GDAM. This being the case, it was expected that more significant differences would be attained when the GDAM scores were covaried with the CAT scores and, likewise, fewer F ratios would retain significance when the LT scores were covaried with the same CAT scores. These results were obtained. Also, as one might expect, both the GDAM and LT correlate significantly with the CAT Total Battery. Of even greater significance, perhaps, is the finding that the covariance of CAT scores with either the GDAM or the LT produce practically the same graphic configuration. The evidence seems to indicate that, with this particular population, the GDAM and the LT are both nearly identical predictors of CAT scores. It must be kept in mind, however, that both the CAT and LT are tests which require more verbal ability than does the GDAM.

The mean difference between these two groups of Ss on the GDAM was only 2.63 while the mean difference on the LT was 4.39. This seems to indicate that the GDAM tends to bring these two divergent populations closer together as far as IQ scores are concerned. The

GDAM seems to predict the scores for both groups as well as the LT does. Although IQ scores might be relative and differ according to the measure being used, it seems evident from this that the GDAM might well be used with this population to more advantage than a verbal type of test.

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TABLE 1

ANALYSIS OF VARIANCE BETWEEN
ANGLO AND SPANISH FIRST GRADE PUPILS' SCORES
ON THE LORGE-THORNDIKE INTELLIGENCE TEST

Analysis of Variance

Source	df	SS	MS	F
Treatments	1	1,497	1,497.0	10.99 **
Within	333	45,380	136.3	
Total	334	46,877		

** $P \leq .01$ Significant at the .01 level

General Statistics

	Mean	Standard Deviation
ANGLO	97.37	11.38
SPANISH	92.98	11.84

TABLE 2

ANALYSIS OF VARIANCE BETWEEN
ANGLO AND SPANISH FIRST GRADE PUPILS' SCORE
ON THE GOODENOUGH DRAW-A-MAN INTELLIGENCE TEST

Analysis of Variance

Source	df	SS	MS	F
Treatments	1	538	538.0	2.36
Within	333	76,000	228.2	
Total	334	76,538		

$P \geq .05$ Not significant at the .05 level

General Statistics

	Mean	Standard Deviation
ANGLO	100.74	15.20
SPANISH	98.11	15.05

TABLE 3

ANALYSIS OF COVARIANCE BETWEEN ANGLO AND SPANISH
FIRST GRADE CHILDREN'S MEAN CAT SCORES WITH THE LORGE-THORNDIKE
AND GOODENOUGH DRAW-A-MAN TEST SCORES

CAT SUB-TEST	GROUP	CAT DATA SD	CAT DATA $\bar{X}$	LT COVARIANCE ADJ $\bar{X}$	LT COVARIANCE F	GDAM COVARIANCE ADJ $\bar{X}$	GDAM COVARIANCE F
Word Form	A	5.50	14.49	14.02	.826	14.38	3.102
	S	5.73	13.20	13.47		13.26	
Word Recognition	A	3.73	13.20	12.86	1.084	13.11	4.433 *
	S	4.14	12.12	12.32		12.18	
Meaning of Opposites	A	2.71	4.59	4.59	12.26 **	4.58	13.23 **
	S	2.33	3.55	3.56		3.56	
Picture Association	A	2.70	6.40	6.19	.005	6.33	.489
	S	2.59	6.09	6.12		6.13	
Total Reading Vocab	A	10.23	38.68	37.65	3,539	38.41	7.968 **
	S	10.54	35.00	35.59		35.15	
Total Reading Comp	A	2.22	1.93	1.83	3.334	1.92	5.947 *
	S	1.74	1.37	1.43		1.38	
Total Reading	A	11.49	40.60	39.45	4.892 *	40.34	10.09 **
	S	11.31	36.16	36.83		36.31	
Arithmetic Meaning	A	4.48	17.36	16.82	.772	17.21	3.952 *
	S	4.96	16.08	16.39		16.17	
Arithmetic Problems	A	3.37	5.56	5.31	6.141 *	5.52	10.65 **
	S	3.25	4.28	4.42		4.30	
Total Arithmetic Reasoning	A	6.57	22.92	22.13	3.658	22.73	8.970 **
	S	7.01	20.35	20.81		20.47	
Arithmetic Addition	A	7.47	10.91	10.29	1.409	10.72	3.899 *
	S	7.60	8.96	9.32		9.07	
Arithmetic Subtraction	A	4.71	4.44	4.18	.219	4.37	1.119
	S	4.24	3.80	3.95		3.84	
Total Arithmetic Fundamentals	A	10.95	15.35	14.47	1.131	15.09	3.501
	S	10.31	12.75	13.26		12.90	
Total Arithmetic	A	15.66	38.11	36.45	2.107	37.66	6.146 *
	S	15.53	33.15	34.11		33.41	
Capitali-zation	A	3.43	6.11	5.97	.249	6.09	.919
	S	3.45	5.69	5.78		5.71	
Punctuation	A	2.90	5.28	5.08	.615	5.23	2.221
	S	2.94	4.71	4.83		4.74	
Word Usage	A	3.98	16.52	16.10	.129	16.42	.591
	S	4.21	16.00	16.25		16.06	
Total Mechanics of English	A	7.84	27.79	27.05	.027	27.60	1.473
	S	7.45	26.47	26.90		26.58	
Total Spelling	A	2.13	2.06	1.93	1.070	2.00	2.463
	S	1.69	1.65	1.72		1.68	
Total Language	A	8.75	30.05	29.17	.371	29.81	2.774
	S	8.30	28.11	28.63		28.25	
Total Battery	A	29.70	108.75	105.06	3.358	107.77	8.960 **
	S	29.23	97.64	99.78		98.21	

N=335
A=Anglo (N=123)
S=Spanish (N=212)

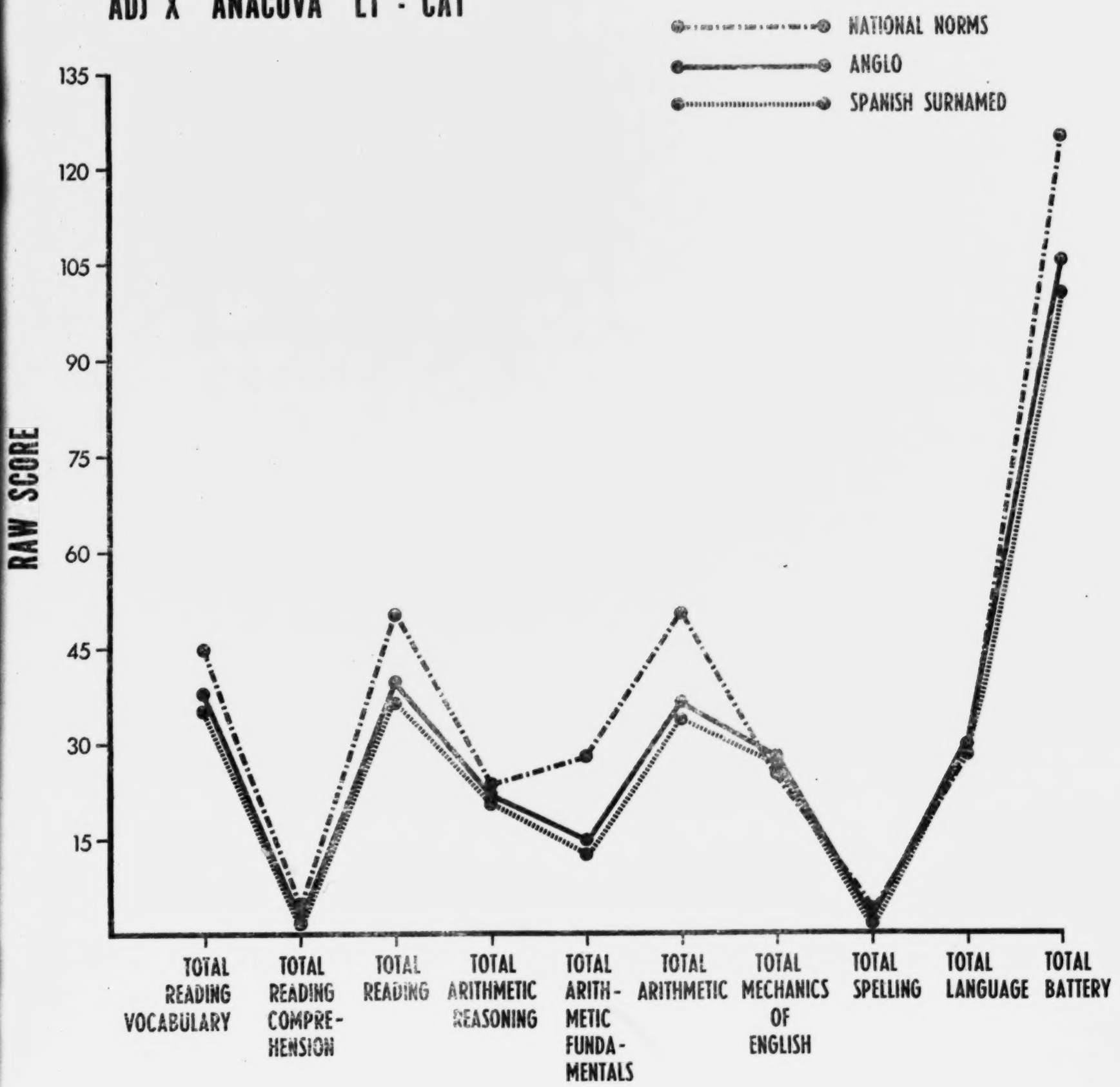
** $p < .01$
* $p < .05$

TABLE 4

CORRELATIONS, MEANS, AND STANDARD DEVIATIONS OF THE GOODENOUGH, LORGE-THORNDIKE, AND CALIFORNIA ACHIEVEMENT TESTS

VARIABLE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1 Goodenough	-																						
2 Lorge-Thorndike	.34	-																					
3 Word Form	.19	.36	-																				
4 Word Recognition	.21	.38	.39	-																			
5 Meaning of Opposites	.07	.09	.22	.05	-																		
6 Picture Association	.23	.33	.39	.61	.13	-																	
7 Total Reading Vocabulary	.25	.43	.82	.75	.40	.71	-																
8 Total Reading Comprehension	.09	.25	.27	.27	.28	.27	.39	-															
9 Total Reading	.22	.44	.78	.72	.43	.68	.96	.51	-														
10 Arithmetic Meaning	.29	.48	.40	.53	.12	.47	.56	.26	.56	-													
11 Arithmetic Problems	.13	.34	.11	.37	.05	.22	.27	.12	.28	.43	-												
12 Total Arithmetic Reasoning	.27	.50	.33	.55	.11	.43	.52	.24	.52	.90	.78	-											
13 Arithmetic Addition	.23	.36	.32	.37	.05	.35	.41	.17	.38	.47	.45	.55	-										
14 Arithmetic Subtraction	.16	.26	.17	.31	.02	.29	.29	.12	.29	.36	.49	.49	.52	-									
15 Total Arithmetic Fundamentals	.23	.37	.31	.40	.04	.37	.41	.17	.39	.49	.53	.60	.93	.79	-								
16 Total Arithmetic	.27	.46	.35	.51	.08	.44	.50	.22	.49	.73	.70	.84	.87	.75	.93	-							
17 Capitalization	.08	.18	.12	.17	.10	.19	.21	.20	.24	.27	.09	.23	.17	.22	.21	.24	-						
18 Punctuation	.18	.31	.26	.30	.04	.28	.36	.20	.34	.38	.10	.31	.24	.22	.26	.32	.23	-					
19 Word Usage	.23	.44	.38	.44	.02	.40	.47	.20	.46	.56	.33	.55	.39	.28	.40	.51	.23	.29	-				
20 Total Mechanics of English	.23	.42	.35	.44	.05	.42	.48	.28	.48	.57	.26	.52	.38	.33	.41	.51	.66	.66	.75	-			
21 Total Spelling	.29	.30	.39	.56	.17	.52	.60	.32	.59	.46	.26	.44	.38	.31	.40	.46	.21	.34	.41	.46	-		
22 Total Language	.27	.45	.41	.51	.11	.49	.57	.32	.57	.61	.29	.56	.43	.36	.46	.55	.64	.66	.76	.97	.62	-	
23 Total Battery	.31	.54	.61	.70	.23	.64	.81	.41	.80	.77	.55	.80	.73	.61	.78	.88	.40	.49	.67	.73	.65	.80	-
$\bar{X}$	99.07	94.6	13.67	12.51	3.93	6.20	36.35	1.58	37.79	16.55	4.75	21.30	9.67	4.03	13.70	34.97	5.85	4.92	16.19	26.95	1.80	28.82	101.72
SD	15.14	11.8	5.67	4.02	2.52	2.63	10.56	1.95	11.56	4.82	3.34	6.95	7.60	4.42	10.61	15.74	3.44	2.94	4.13	7.61	1.87	8.51	29.84

Significance: $.01 \leq .148$
$.05 \leq .113$


ADJ X ANACOVA LT - CAT
NATIONAL NORMS
ANGLO
SPANISH SURNAMED
RAW SCORE
135
120
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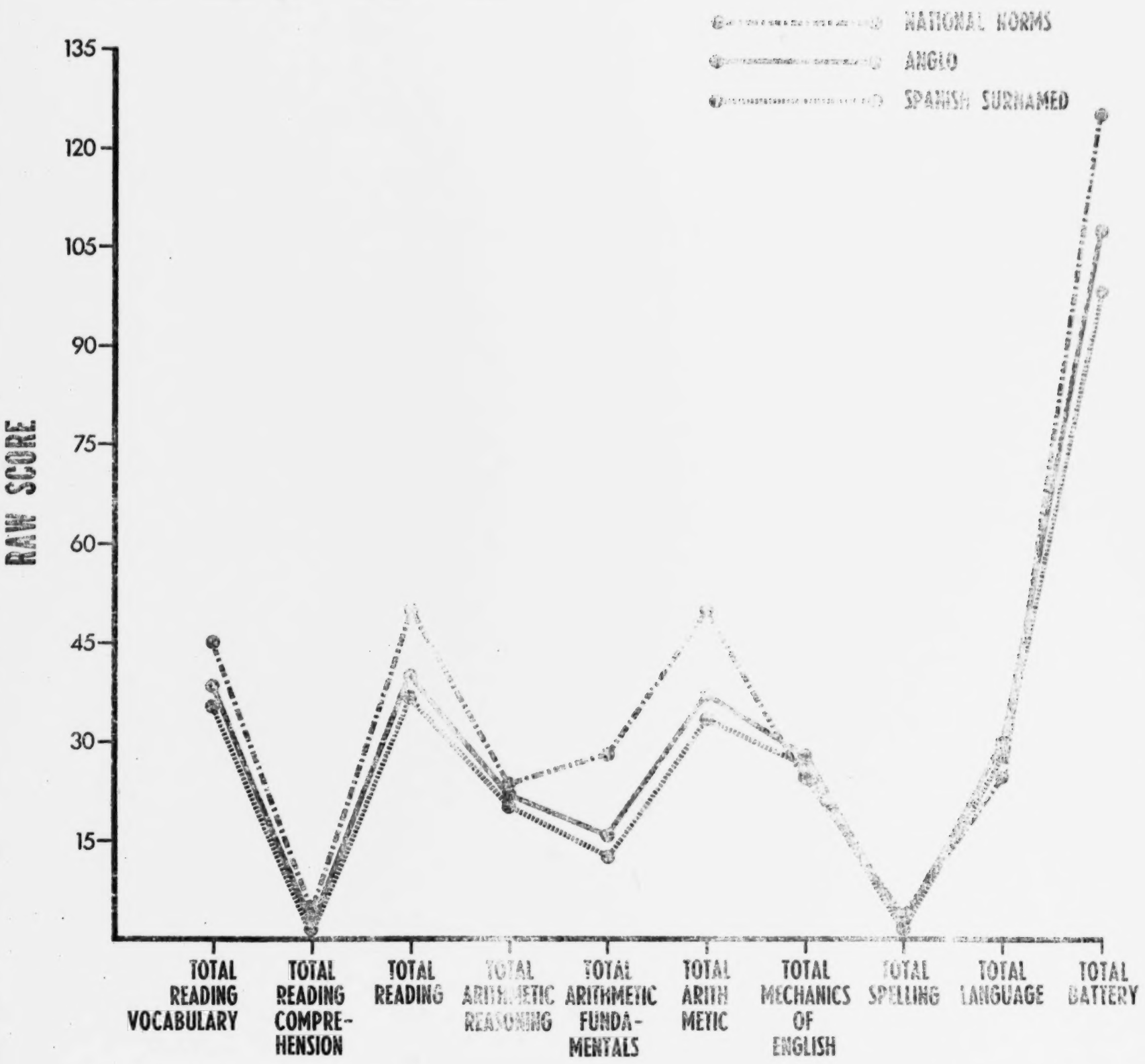
TOTAL READING VOCABULARY
TOTAL READING COMPRE-HENSION
TOTAL READING
TOTAL ARITHMETIC REASONING
TOTAL ARITH-METIC FUNDA-MENTALS
TOTAL ARITHMETIC
TOTAL MECHANICS OF ENGLISH
TOTAL SPELLING
TOTAL LANGUAGE
TOTAL BATTERY
CAT SUB-TESTS

Figure 1


ADJ X ANACOVA GDAM - CAT
NATIONAL NORMS
ANGLO
SPANISH SURNAMED
RAW SCORE
135
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TOTAL READING VOCABULARY
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Figure 2